followed by removal of the head element 20 from the disk drive at block 42. In the case of a new disk drive, the slider and head element are formed into a subassembly, together with the suspension and, perhaps, the actuator arm, in block 44. In either case, a protective coating 28 is applied to the head element at block 46 using one of the above described processes, or perhaps other processes known to those skilled in the art. As a practical matter, the protective coating will not be applied solely to the head element 20, given the relatively small size of the components. Rather, the protective coating will be applied to the head-gimbal assembly (generally comprising the head, slider and suspension) or to the head-stack assembly (generally comprising the head, slider, suspension and actuator arm.)

The protective coating 28 should be relatively inert and have a relatively low surface energy or surface tension. It is preferred that the protective coating 28 be a fluorocarbon polymeric coating, such as, but not limited to, FC722 produced by 3M®. The preferred thickness "t" of protective coating 28 will vary depending upon the polymeric material used and it will be appreciated by those skilled in the art upon reading this that any coating, if even a minimal thickness, such as a monolayer, is better than no coating at all. From experimentation, the inventors have learned that it is preferable to apply the protective coating in a thickness of greater than 50 angstroms, up to approximately 250 angstroms, if it is understood that the thickness of the coating will be subsequently reduced prior to assembly of the drive. A thick coating, greater than 50 angstroms, will provide adequate corrosion protection for the type of reworking contemplated herein.

The protective coating 28 may be deposited using a solvent-mediated deposition process; however, other processes exist to apply the protective coating 28, including placing the head element 20 and slider 18 in a vacuum chamber and using a vapor-mediated process. Precursor molecules in the vapor phase may be deposited by exposing the head element 20 and slider 18 to precursor gases and excitation, such as by heat, ultraviolet, infrared, or plasma energy to form the protective coating 28.

Fig. 4 is a flow diagram which discloses the basic steps of performing two related methods of this invention, one relating to reworked disk drives and the other to new or reworked HSAs or HGAs. First, in the case of an existing disk drive, the disk drive is opened at block 40, followed by removal of the head element 20 from the disk drive at block 42. In the case of a new or reworked HSA or HGA, the slider and head element are formed into a subassembly, together with the suspension and, perhaps, the actuator arm in block 44. In either case, a protective coating 28 is applied to the head element at block 46 using one of the above described processes, or perhaps other processes known to those skilled in the art.

Fig. 5 is another flow diagram showing a more detailed process which may be conducted in accordance with the methods of this invention. Optional process steps are shown in dotted lines. One such optional step consists of cleaning the head element 20 at block 48. Preferably, this step is performed prior to the step of applying the protective coating 28 at block 46 and preventing trapping debris underneath the protective coating. Of course, the type of cleaning solutions that can be used will be apparent to those skilled in the art upon reading this disclosure.

Following the step of applying the protective coating at block 46, another optional step consists of performing post-processing of the protective coating at block 50. Post-processing is performed by exposing the deposited film to ultraviolet, infrared, plasma, or other forms of energy that cause the polymer coating to cross-link, thereby providing increased corrosion protection.

In addition to performing the optional step of post-processing the protective coating, it may also be necessary to ship and/or store the head elements. As an example, shipping may be necessary in order to transport the head elements or other interconnected components of the disk drive (HSA or HGA) to a vendor to perform rework. Alternately, the head elements may be removed and temporarily stored at the point of disassembly while other components of the disk drive are reworked. This optional step of storing or shipping the head element is shown at block 52. To perform this step, the coated heads are mounted on a shipping comb and placed within a protective container (not shown), such as is described in U.S. Patent Application Serial No. 09/923,500 filed on August 6, 2001 and incorporated herein by reference.

A further step consists of reworking the disk drive components at block 54. For this step, any necessary repairs to the drive components are performed after having previously applied the protective coating at block 46. Once the drive components have been reworked, or replacement parts have been obtained, and the drive is ready for reassembly, the head element will be cleaned at block 56 to reduce the thickness of the protective coating to less than 20 angstroms. When utilizing fluorocarbon polymers, it has been discovered that a non-aqueous solvent, such as hydrofluoroether, will reduce the thickness of the coatings to below 20 angstroms.